

Appln. No.: 09/981,414
Amdt. dated July 2, 2004
Reply to Office action of March 2, 2004

LISTING OF CLAIMS:

1-35(Cancelled).

36(Previously Amended). The piston of claim 70 wherein said pin bores have laterally opposed edges and said recesses extend laterally inwardly of said pin bore edges at a location above said pin bore axis.

37(Original). The piston of claim 36 wherein said recesses extend laterally across said pin bosses above said pin bores.

38(Previously Amended). The piston of claim 70 wherein said pin bosses have outer faces and said recesses extend inwardly of said pin bore faces.

39(Previously Amended). The piston of claim 70 wherein strut portions have lower edges and said recesses each have a longitudinally undercut lower edge that is spaced at least in part from said associated lower edge of said strut portion.

40(Previously Amended). The piston of claim 70 wherein a portion of said recess extends into said skirt portions of said skirt.

41(Original). The piston of claim 40 wherein said skirt portions have a lower edge and said extended portion of said recess is spaced from said lower edge of said skirt portions.

42(Previously Amended). The piston of claim 70 wherein said recesses are symmetrical across a longitudinal plane containing both said longitudinal axis of said piston and said pin bore axis.

43(Original). The piston of claim 42 wherein each of said recesses extend across said longitudinal plane above said pin bores.

44(Previously Amended). The piston of claim 70 wherein said piston head includes at least one oil cooling gallery.

45(Original). The piston of claim 44 wherein said piston head includes at least one friction welded joint.

46(Original). The piston of claim 45 wherein said gallery has a closed bottom end.

47(Previously Amended). The piston of claim 70 wherein said piston skirt has an upper end and said ring belt has a lower end.

48(Original). The piston of claim 47 wherein said upper end of said piston skirt is coupled to said lower end of said ring belt to define at least one closed oil cooling gallery within said piston head.

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49(Original). The piston of claim 47 wherein said piston skirt is friction welded to said ring belt.

50(Previously Amended). The piston of claim 70 wherein said piston is fabricated of steel.

51(Previously Amended). The piston of claim 70 wherein said piston head includes an upper crown having said ring belt defining an outer circumferentially continuous wall having a lower joining surface and a circumferentially continuous inner wall spaced radially inwardly of said ring belt and having a lower joining surface, and a lower crown having said piston skirt defining an outer circumferentially continuous wall having an upper joining surface and a circumferentially continuous inner wall spaced radially inwardly of said piston skirt and having an upper joining surface, and whereby said upper and lower joining surfaces of said inner and outer walls are joined by friction welding to define at least one closed oil cooling gallery.

52(Original). The piston of claim 51 wherein said piston head includes a radially inner and radially outer cooling gallery separated by said inner wall.

53(Original). The piston of claim 51 wherein said piston head includes at least one oil drain opening.

54(Original). The piston of claim 51 wherein said lower crown includes a circumferential recess between said inner and outer wall extending below said upper joining surfaces of said inner and outer walls to define a lower portion of said cooling gallery residing below said friction weld joint and extending into said lower crown.

55(Original). The piston of claim 54 wherein said outer wall of said lower crown is formed with at least one of said ring grooves residing below said friction weld joint of said outer walls of said upper and lower crowns.

56(Original). The piston of claim 54 wherein said circumferential recess extends into said skirt portions of said lower crown.

57(Original). The piston of claim 51 wherein said joining surfaces of said outer walls are spaced above said joining surface of said inner walls in a different plane.

58(Previously Amended). The piston of claim 70 wherein said pin bosses include inner faces separated by a lateral space and a forged cavity located above said pin bores in open communication with said space and being undercut in said pin bosses so as to

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extend laterally outwardly of said inner faces of said pin bosses in the direction of said pin boss axis.

59(Original). The piston of claim 58 wherein said piston head includes an upper crown and a lower crown part having adjoined inner walls thereof with an inner surface spaced laterally outwardly of said inner faces of said pin bosses and defining a longitudinally extending inner surface of said cavity, said inner walls having a joint passing through said cavity.

60(Previously Presented). The piston of claim 59 wherein said joint comprises a friction weld joint.

61(Previously Presented). The piston of claim 59 wherein said inner surface of said inner walls extend vertically upwardly or at a positive outward draft angle from said inner faces to said joint.

62(Original). The piston of claim 58 wherein said cavity extends into said upper crown above said joint in said undercut relation to said inner faces of said pin bosses.

63(Original). The piston of claim 58 wherein head includes a closed oil gallery surrounding said cavity and separated therefrom by said inner walls.

64(Original). The piston of claim 58 wherein said inner faces are set at an angle such that said pin bosses have a varying width longitudinally of said piston between a lower end of said pin bosses and an upper region above said pin bosses adjacent said cavity.

65(Original). The piston of claim 64 wherein said width of said pin bosses increases continuously across said pin bores.

66(Original). The piston of claim 64 wherein said space between said inner faces decreases in the longitudinal direction from said lower end of said pin bosses toward said cavity.

67-69(Cancelled).

70(Previously Amended). A forged piston comprising:

a piston head having a combustion bowl and a ring belt with a plurality of ring grooves formed therein;

a pair of pin bosses extending downwardly from said piston head having pin bores formed therein aligned along a common pin bore axis transverse to a longitudinal axis of the piston head;

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a piston skirt forged as one piece with said pin bosses including a pair of opposed skirt portions spaced from said pin bosses and intervening strut portions extending between and uniting said skirt portions to said pin bosses, said strut portions presenting outer surfaces facing in opposite directions along said pin bore axis and having lower edges; and

forged recesses formed in said outer surfaces of said strut portions;

wherein said piston skirt portions are tapered so as to increase in thickness in the longitudinal direction of said piston from a lower end of said skirt portions toward said piston head as measured in a longitudinal plane perpendicular to said pin bore axis;

said piston skirt portion includes an outer wall and an inner wall, said inner wall being set at an angle with respect to said outer wall to provide a continuously increasing said thickness in the longitudinal direction away from said lower end of said skirt portions; and

wherein said angle is set at less than 3°.

71-77(Cancelled).